the universal signature object (100). In yet another embodiment, the verification means (608) checks a digital signature or the USO (100) against an archived copy. In an alternate embodiment, the USO viewer (600) includes a printing means (610) for printing information accessed or displayed by the viewer means (604).

[0018] In yet another aspect, a signing program (400) includes a key-accessing means (402), a key-verification means (404), transaction tracking means (406), and a universal-signature-object generating means (408). Key-accessing means (402) accesses the private (202) and public (204) keys of a signatory. Key-verification means (404) verifies the authenticity of the private and public key pair (202, 204). The USO generating means (408) generates a universal signature object (100) or appends a digital signature to an existing universal signature object (100). In another embodiment, the signing program (400) includes a timestamping means (410) for providing a timestamp of a digital signature. In yet another embodiment, the signing program (400) includes a transaction tracking means (406) for tracking a digital signature and/or a universal signature object (100).

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Fig. 1 is a graphical depiction of a universal signature object.

[0020] Fig. 2 is a block diagram of an embodiment of a system capable of generating and utilizing a universal signature object.

[0021] Fig. 3 is a block diagram of a computer system capable of executing an application or applications, such as a signing program and a universal-signature-object viewer.

[0022] Fig. 4 is a functional block diagram of an embodiment of the signing program.

[0023] Fig. 5 is a flow diagram of an embodiment of a method utilized by the signing program to generate a universal signature object.

[0024] Fig. 6 is a functional block diagram of an embodiment of the universal-signature-object viewer.

[0025] Fig. 7 is a block diagram of an embodiment of a system capable of utilizing a universal signature object.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0026] Figure 1 shows a graphical depiction of a universal signature object 100. Universal signature object (USO) 100 binds digital data 200 to digital signature(s). The USO 100 comprises at least one version 102 of the digital data 200. Digital data 200 includes any digital information, such as a digital document or documents, digital graphics, digital audio, digital video, computer applications, email, and the like.

[0027] Universal signature object 100 can also contain a number of additional versions 103, 104 of the digital data 200. Each of the versions 102-104 has a file format. For example, if the digital data 200 is a business contract generated by a word processor, such as MS Word® by MicroSoft Corporation of Redmond, Washington, the first version 102 of the digital data 200 may be in a MS Word® file format. Another version 103 of the digital data 200 might be in a WordPerfect® file format compatible with the WordPerfect® word processor application by the Corel Corporation. Yet another version 104 might include the digital data 200 in a generic or cross-platform file format that can easily be ported between different applications. For example, the digital data 200 may be stored in version 104 as a text format or rich text format. Because version 104 has a file format that is compatible with multiple applications, the digital data 200 can be utilized by many word processor or text editor applications, including MS Word®, WordPerfect®, and Sun Microsystems' StarOffice™ -- to name just a few such applications.

[0028] The universal signature object 100 also contains information 106 concerning an application compatible with a file format of at least one of the versions 102-104. This information 106 could include identifying what application generated a version, what application or applications are compatible with a version, a pointer to the application, or an executable copy of an application compatible with a version. If the digital data 200 is an executable file, the

information 106 can be a reference to one of the versions. That is, since the digital data is an application, it is its own compatible application.

[0029] The universal signature object 100 also contains signature information 108. The signature information 108 can be signature information of one signatory 110 or of multiple signatories 110-120. Using signature information 110 as representative of the other sets of signature information, signature information 110 contains a digital signature 112 of signature data. The signature data is a function of the digital data 200. For example, the signature data could be any of the versions 102-104 of the digital data 200, a hash of any of the versions 102-104, the universal signature object 100 itself (excluding the digital signature), or a hash of the universal signature object 100. The signature data could also include any combination of the foregoing examples of signature data. The signature data is functionally related to the data 200 in such a way that the digital signatures are effectively signatures of the digital data 200.

[0030] As depicted in Figure 1, the signature information 110 can contain one 112 or more digital signatures 114. Furthermore, the different sets of signature information 110, 120 need not contain the same number of digital signatures. For example, the first signatory may only wish to include three digitals signatures, for example, a digital signature of a hash of version 102, a digital signature of version 104, and a digital signature of a hash of the universal signature object 100. An additional signatory many include only one digital signature 122, for example, a digital signature of a hash of the universal signature object 100. It shall be noted that by digitally signing the hash of the universal signature object 100, the additional signatory countersigns the previous signatures since the previous signatures are included as part of the universal signature object 100.

[0031] In one variant, the signature information 110 also contains timestamp information 116. The timestamp information can contain a separate timestamp for each signature 112-114 or for only some of the signatures 112-114. Alternatively, the timestamp information 116 could be a single timestamp for all of the signatures 112-114.